FORM PTO-1390 (REV. 1-98) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER	U.S. APPLICATION NO. (If known, see 37 CFR 1.5)
BIF103839	09/647546

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/FR99/00764	1 April 1999	2 April 1998

TITLE OF INVENTION
OPTICAL SYSTEM, IN PARTICULAR INTRAOCULAR LENS, CONTACT LENS

APPLICANT(S) FOR DO/EO/US
Bernard FEURER and Monique MAUZAC

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. [X] This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.
2. [ ] This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.
3. [X] This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. [X] A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. [X] A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. [X] is transmitted herewith (required only if not transmitted by the International Bureau).
   b. [ ] has been transmitted by the International Bureau.
   c. [ ] is not required, as the application was filed in the United States Receiving Office (RO/US).
6. [X] A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. [ ] Amendments to the claims of the International Aplication under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. [ ] are transmitted herewith (required only if not transmitted by the International Bureau).
   b. [ ] have been transmitted by the International Bureau.
   c. [ ] have not been made; however, the time limit for making such amendments has NOT expired.
   d. [ ] have not been made and will not be made.
8. [ ] A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).
9. [ ] An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. [ ] A translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. [X] An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. [ ] An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. [X] A FIRST preliminary amendment.
    [ ] A SECOND or SUBSEQUENT preliminary amendment.
14. [ ] A substitute specification.
15. [ ] A change of power of attorney and/or address letter.
16. [X] Other items or information:

International Preliminary Examination Report.

Search Report.

Application Data Sheet.

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
09/647546	PCT/FR99/00764	BIF103839

17. [X] The following fees are submitted:	CALCULATIONS PTO USE ONLY	
BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):		
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO ..... $ 970.00		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO $840.00		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO $690.00		
International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) $670.00		
International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) $96.00		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 860	
Surcharge of $130.00 for furnishing the oath or declaration later than [ ] 20 [X] 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$ 130	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	2 - 20 =	0	x $18.00	$ 0	
Independent claims	1 - 3 =	0	x $78.00	$ 0	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ $260.00	$	
TOTAL OF ABOVE CALCULATIONS =				$ 990	
Reduction of 1/2 for filing by small entity, if applicable. A Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28). +				$	
SUBTOTAL =				$ 990	
Processing fee of $130.00 for furnishing the English translation later than [ ] 20 [ ] 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				$	
TOTAL NATIONAL FEE =				$ 990	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). $40.00 per property +				$	
TOTAL FEES ENCLOSED =				$ 990	
				Amount to be refunded:	$
				charged:	$

a. [X] A check in the amount of $ 990 to cover the above fees is enclosed.

b. [ ] Please charge my Deposit Account No. _____ in the amount of $ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. [X] The Commissioner is hereby authorized to charge any additional fees which may be required by 37 CFR 1.16 and 1.17, or credit any overpayment to Deposit Account No. 25-0120. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.

October 2, 2000

SEND ALL CORRESPONDENCE TO:

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SIGNATURE

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NAME

35,041
REGISTRATION NUMBER

PATENTS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Bernard FEURER et al.

Serial No. (unknown)

Filed herewith

OPTICAL SYSTEM, IN PARTICULAR
INTRAOCULAR LENS, CONTACT LENS

PRELIMINARY AMENDMENT

Commissioner for Patents

Washington, D.C. 20231

Sir:

Prior to calculation of the filing fee, please substitute Claims 1-8 as originally filed, which appear on page 12, with Claims 1 and 2 as filed in the Article 34 amendment of June 19, 2000. The page containing Claims 1 and 2 is marked "AMENDED SHEET" and is attached hereto.

R E M A R K S

The above change in the claims merely places the national phase application in the same condition as it was during Chapter II of the international phase.

Respectfully submitted,

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October 2, 2000

OPTICAL SYSTEM, IN PARTICULAR INTRAOCULAR LENS, CONTACT LENS

The present invention relates to optical systems, in particular centered optical systems such as intraocular lenses, contact lenses, etc.

It is known that the human eye is a complex optical system whose role is to transmit to the brain the images arriving thereat. One of the essential components is the lens. The crystalline lens, located behind the iris, is a transparent gelatinous mass contained in the lens sac.

Opacification of the crystalline lens may occur with increasing age (cataract). All that can be done in that case is to remove the defective crystalline lens and replace it with an artificial crystalline lens or an intraocular lens.

The artificial crystalline lenses known to date are essentially made of acrylic materials, for example polymethyl methacrylate or copolymers thereof, or of silicone derivatives. They have relatively low refractive indices. For silicones, refractive indices of between 1.41 and 1.46 are currently available in the best of cases. For strong corrections, it is thus necessary to use intraocular lenses whose faces have a large curvature and which are consequently very thick in their optical axis.

In order to obtain the best correction without inducing astigmatism defects, it is also necessary to introduce the intraocular lens by making the smallest possible incision. To do this, flexible materials of the largest possible refractive index are sought so as to obtain a very thin intraocular lens.

In a healthy eye the crystalline lens is capable, under the action of muscles, the zonulae, which act upon the lens sac, of modifying its radius of curvature so as to adapt itself to close vision or distant vision.

Replacing the crystalline lens with an intraocular lens no longer allows accommodation to take place.

One of the aims of the present invention is to produce an optical system such as an intraocular lens which overcomes the drawbacks of those of the prior art.

More specifically, the subject of the present invention is an optical system, in particular an intraocular lens or contact lens, characterized in that it is made of a material whose optical refractive index shows variations in at least one given direction.

According to one characteristic of the invention, the said material is a homogeneous material whose refractive index is variable as a function of its chemical composition.

According to another characteristic of the invention, the said material is a heterogeneous material with molecular orientations which vary in different zones.

According to another characteristic of the invention, the said material is a homogeneous material capable of modifying its optical refractive index when it is subjected to the action of external phenomena.

Another application is the production of bifocal contact lenses, allowing a simultaneous correction of two visual defects (for example myopia and presbyopia):

- either by juxtaposition of two materials, a central material and a peripheral material, of similar nature but of different indices, by means of different degrees of grafting onto the same matrix;

- or by juxtaposition of two different domains of the same material, the two domains having refractive indices that are different by virtue of a molecular orientation;

- or by producing a material whose index varies under the effect of a mechanical stress, for example the pressure of the eyelids.

Other characteristics and advantages of the present invention will become apparent in the course of the description which follows, given with regard to the drawings attached for illustrative but in no way limiting purposes, in which:

Figures 1 and 2 represent graphs for explaining the variations in the properties of materials used to produce an optical system such as an intraocular lens according to the invention as a function of the composition of these materials, the graph in Figure 1 showing the change in glass transition temperatures as a function of the content of substituents, and the graph in Figure 2 showing the change in refractive index n as a function of the content of substituents.

The optical system such as the intraocular lens according to the invention is made of a material whose optical refractive index shows variations in at least one given direction.

In a first embodiment, this material is homogeneous and has a high refractive index n which varies according to its chemical composition.

Specifically, for a given molecule, the molar refraction R is, to a first approximation, an additive function of the contributions of the various elements present in the molecule. Among the common chemical groups, those which have the greatest effects in increasing R are mainly sulfur, the halogens, in particular chlorine, bromine and iodine, and aromatic nuclei.

The refractive index n of the molecule increases as R increases, such that it is the molecules containing the elements mentioned above which have the largest indices.

Examples:	benzene	n = 1.498
	o-dichlorobenzene	n = 1.551
	carbon disulfide	n = 1.628
	diiodomethane	n = 1.749

Similarly, the addition of groups of high refractive index n to a polymer increases the refractive index of the material.

By way of example, mention will be made of the case of silicones substituted with 9-vinylanthracene moieties. The refractive index of the material obtained increases as the content of substituents increases:

- without substituent: n = 1.403
- with 94% substituents: n = 1.690

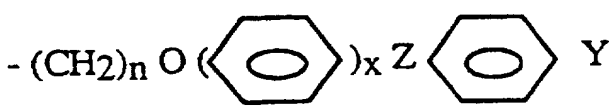
The glass transition temperatures Tg also increase as the degree of substitution increases due to the rigidity of the aromatic nuclei:

- without substituent: Tg = -130°C
- with 94% substituents: Tg = between 10°C and 20°C

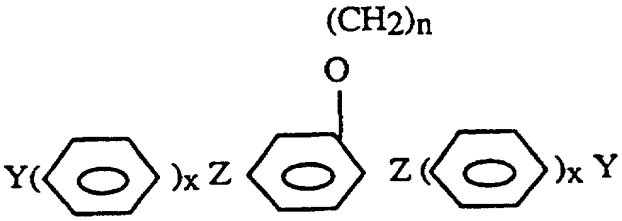
The process for manufacturing the homogeneous material having a high refractive index n which is variable according to its chemical composition, and which is necessary for producing an intraocular lens according to the invention, comprises the following two steps:

Firstly, groups chosen from those described above, in particular aromatic nuclei whose presence also gives the material obtained the capacity to filter out ultraviolet radiation, which is an essential property for a high-quality intraocular lens, are fixed onto the polymers used for the lenses and artificial crystalline lenses, this fixing being obtained via a flexible portion so as to disrupt the temperature Tg as little as possible.

Examples: substituent of type [1]:



substituent of type [2]:



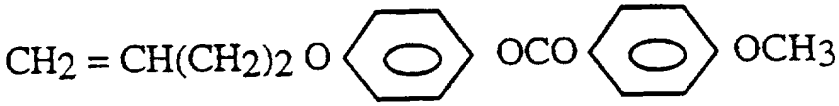
with Z = OCO, COO,-, ...
Y = H, OC_mH_{2m+1}, C_mH_{2m+1}, ...
with n>2, m≥1, x=1, 2, 3, ...

Next, the degree of substitution is modified continuously, and thus also the refractive index of the material, in order to obtain copolymers with a moduleable proportion of substituted units and of unsubstituted units. In the case of silicones, it is necessary to prepare the copoly(methylhydrogenodimethyl)siloxane of variable composition beforehand.

Two examples are given below, one starting with a silicone support, the other starting with an acrylate support, the substituent chosen corresponding to formula [1] above in which n=4, Z=OCO, $Y=OC_mH_{2m+1}$ with m=1 and x=1.

In the case of the first example, that with a silicone support, the substituent must have a vinyl end bonding group:

Example:



This group can be obtained in two steps: reaction of 4-bromobutene with hydroquinone, followed by esterification with p-methoxybenzoic acid.

The main siloxane chain has a random distribution of methylhydrogenosiloxane substitutable units and of dimethylsiloxane unsubstitutable units in variable proportion. These copolymers are obtained by acid-catalyzed

redistribution of dimethylsiloxane units introduced in adequate amount via octamethylcyclotetrasiloxane and of methylhydrogenosiloxane units provided by homopolymethylhydrogenosiloxanes.

The substituent is fixed onto the main chain by hydrosilylation at 60°C in the presence of a solvent. It is introduced in deficit relative to the methylhydrogenosiloxane units (from 5% to 15%) in order to allow a subsequent reaction of the excess units during the crosslinking step.

At the end of the hydrosilylation reaction, the polymer is freed of virtually all of the solvent by evaporation under vacuum at room temperature. It is then mixed with a crosslinking agent, and the rest of the solvent is evaporated off under vacuum.

The crosslinking agent is preferably a flexible chain and is terminated with two vinyl ends. Its proportion is such that the amount of vinyl bonding groups corresponds to the amount of methylhydrogenosiloxane units left free.

Example of a crosslinking agent:

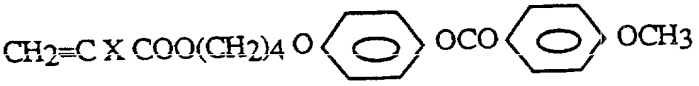
$CH_2=CH(CH_2)_pCH=CH_2$ p = 2 to 20

$CH_2=CH(Si(CH_3)_2O)_qCH=CH_2$ q = 2 to 10

The polymer/crosslinking agent mixture is cast in a mold treated such that the material does not stick to the walls. The mold is placed at 60°C in an oven for several hours in order to obtain a crosslinked polymer, which is removed from the mold.

This product can be washed by swelling it with a solvent, in order to remove any unreacted molecules, followed by drying it slowly.

In the second example, that with an acrylate support, the acrylate or methacrylate monomer, bearing the chosen substituent, must be synthesized:

Example: 

with X = H, CH_3

This group can be obtained in four steps: reaction of 4-bromobutanol in which the alcohol function has been protected, with hydroquinone; esterification with p-methoxybenzoic acid; deprotection of the alcohol function; esterification between this alcohol function and the carboxylic group of acrylic or methacrylic acid.

A bifunctional monomer containing an acrylate or methacrylate function at both ends must also be synthesized. It can be obtained according to the following scheme: reaction of 4-bromobutanol, in which the alcohol function has been protected, with hydroxybenzoic acid; esterification with the product of the reaction of 4-bromobutanol, in which the alcohol function has been protected, with hydroquinone; deprotection of the alcohol functions; esterification of these alcohol functions with the carboxylic functions of acrylic or methacrylic acid.

Other bifunctional monomers can be used: ethylene glycol dimethacrylate; triethylene glycol dimethacrylate; tetraethylene glycol dimethacrylate; 1,6-hexanediol dimethacrylate; 1,12-dodecanediol dimethacrylate.

The polymerization is initiated by heating or UV irradiation in the presence of an initiator (for example azobisisobutyronitrile) or by any other common system (chemical accelerator, microwave irradiation).

The production of crosslinked materials with a variable proportion of substituents is possible by mixing, prior to the polymerization reaction, one or more unsubstituted monomers (methyl acrylate, methyl methacrylate or hydroxyethyl methacrylate, for example) with the above monofunctional and bifunctional monomers in

suitable proportion. Hydroxyethyl methacrylate (HEMA) gives the material a hydrophilic nature until a degree of hydration of 40% for a homopolymer is obtained. Even more hydrophilic comonomers may be combined therewith, such as N-vinylpyrrolidone (VP) for example.

The lenses or crystalline lenses can be obtained either by machining the final materials or by carrying out the final step (polymerization/crosslinking) in a mold. When the base monomer has hydrophilic properties, the final material can be swollen in aqueous medium and become more or less pliable depending on its composition.

Compared with the base acrylates or silicones, the materials thus obtained have properties which allow the preparation of artificial crystalline lenses, intraocular lenses or contact lenses according to the invention.

Specifically, their refractive index n and their glass transition temperature Tg are higher and vary according to their chemical composition. In particular, they increase as the proportions of substituents increase.

One example of this change is illustrated in Figures 1 and 2 for the silicone materials whose method of synthesis has been given hereinabove.

In this example, the crosslinking agent is an alkyl chain; a crosslinking agent with three different chain lengths corresponding to 10, 16 or 22 carbons was studied; three different proportions of this crosslinking agent were introduced (5, 10 and 15%). These two parameters have little influence on the change in the refractive index or in the glass transition temperature, as may be seen in Figures 1 and 2.

On the other hand, the refractive index increases very rapidly as the content of substituents increases, Figure 2, since with 40% substituents, indices above 1.53 are obtained.

The change in the glass transition temperature,

Figure 1, is slower. Even with total substitution, the Tg remains less than room temperature.

The mechanical properties are relatively unaffected by the substituents. For example, the modulus of elasticity under shear (G') at zero frequency:

unmodified silicone: $G' = 10^5$ Pa

silicone with more than 85% substituents: $G' = 4 \times 10^4$ Pa

According to a second embodiment, the material of which the intraocular lens according to the invention is made is a heterogeneous material with a high and variable index in the material.

The aromatic substituents proposed above are thermotropic liquid crystals. They give the polymer bearing them mesomorphic properties, i.e., in particular, molecular orientation properties: within a given temperature range, these substituents very readily become oriented under the effect, for example, of a magnetic or electric field. This orientation is then "set" by the crosslinking process.

Under the orientation effect as mentioned above, the refractive index becomes anisotropic. It is thus possible, by orienting the substituents, to modify the refractive index in a given direction.

According to the present invention, the optical system is obtained from the same polymer, for example silicone or acrylate or methacrylate, by preparing batches with different indices obtained by orienting the substituents in different directions.

The orientations can be obtained by placing the substituted polymer (in the case of silicones) or the various monomers, substituted or unsubstituted (in the case of acrylates) in a weak magnetic field of about 1 Tesla or in an electric field, or by a surface treatment of the device allowing the material or lens to be manufactured in its final shape. The crosslinking (in the case of

silicones) or the polymerization/crosslinking (in the case of acrylates) are carried out by heat treatment, for example, under this orientating field.

These batches of identical chemical nature are entirely compatible. They may be assembled so as to form lenses or crystalline lenses with different accommodation zones. For example, an intraocular lens may be produced in two parts: a central optical zone adapted for close vision and a peripheral zone adapted for distant vision.

According to a third embodiment, the material used to produce the optical system such as the intraocular lens according to the invention is a homogeneous material of high index which is variable by means of a mechanical effect, thereby allowing accommodation.

According to one characteristic of the invention, the material of which the optical system is made is a three-dimensional liquid crystal polymer whose mesomorphic moieties can be readily oriented by means of a mechanical effect.

It is possible, for example, firstly to prepare crosslinked liquid crystal polymers without prior orientation of the mesogenic units. Using this material, artificial crystalline lenses or intraocular lenses will then be produced, for example by polymerization/cross-linking in a mold or by machining depending on the properties of the material. The zonulae exert a mechanical stress which is reflected, via the lens sac, onto the crystalline lens. This stress modifies the orientation of the liquid crystal substituents and thus the refractive index in the direction of vision. Similarly, in the case of contact lenses, a pressure from the eyelids can produce mechanical deformations needed for the molecular reorientation and thus vary the refractive index and consequently the power of the lens.

It is also possible to give these materials a pre-

orientation of the substituents during their production, which preorientation will be modified under the effect of compressions or stretches transmitted to the sac via the zonulae.

In order for the material without preorientation of the mesogenic units to be transparent, or in order for a preoriented material to remain transparent after the disorientation, it is placed in isotropic phase under the conditions of use. Furthermore, in order to obtain a sufficient orientation under stress and thus a significant modification of the refractive index, it is necessary to carry out the process in a temperature range about 10°C above the temperature T_I at which the sample becomes isotropic. This obligation imposes an upper limit on the degree of substitution, as illustrated in Figure 1. In the example chosen, a siloxane modified to about 35% would be entirely suitable for use: it is isotropic at about 35°C with a refractive index of greater than 1.51 (Figure 1).

In the isotropic phase, the index variation is proportionately greater the closer the temperature of use is to T_I. An example of the difference in index between two perpendicular directions, Δn, induced by a mechanical stress is given below. The compound chosen corresponds to a methacrylate substituted with various groups of type [2] defined above:

at T_I + 4°C $\Delta n = 6 \times 10^{-3}$ for a stress of 5×10^{-2} $N.mm^{-2}$

$\Delta n = 2 \times 10^{-3}$ for a stress of 2×10^{-2} $N.mm^{-2}$

at T_I + 25°C $\Delta n = 1 \times 10^{-3}$ for a stress of 5×10^{-2} $N.mm^{-2}$

$\Delta n = 0.3 \times 10^{-3}$ for a stress of 2×10^{-2} $N.mm^{-2}$

CLAIMS

1. Optical system such as an intraocular lens made of a homogeneous material whose optical refractive index shows variations in at least one given direction, characterized in that the said index is high and variable under the action of mechanical effects.

2. Optical system according to claim 1, characterized in that the homogeneous material consists of at least one three-dimensional liquid crystal polymer material.

14 NOV. 2000

Declaration and Power of Attorney for Patent Application

Déclaration et Pouvoirs pour Demande de Brevet

French Language Declaration

En tant que l'inventeur nommé ci-après, je déclare par le présent acte que:

As a below named inventor, I hereby declare that:

Mon domicile, mon adresse postale et ma nationalité sont ceux figurant ci-dessous à côté de mon nom.

My residence, post office address and citizenship are as stated next to my name.

Je crois être le premier inventeur original et unique (si un seul nom est mentionné ci-dessous), ou l'un des premiers co-inventeurs originaux (si plusieurs noms sont mentionnés ci-dessous) de l'objet revendiqué, pour lequel une demande de brevet a été déposée concernant l'invention intitulée

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Optical system, in particular intraocular lens, contact lens

et dont la description est fournie ci-joint à moins que la case suivante n'ait été cochée:

the specification of which is attached hereto unless the following box is checked:

☐ a été déposée le _____ sous le numéro de demande des Etats-Unis ou le numéro de demande international PCT _____ et modifiée le _____ (le cas échéant).

☒ was filed on April 1ar, 1999 as United States Application Number or PCT International Application Number PCT/FR99/00764 and was amended on _____ (if applicable).

Je déclare par le présent acte avoir passé en revue et compris le contenu de la description ci-dessus, revendications comprises, telles que modifiées par toute modification dont il aura été fait référence ci-dessus.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

Je reconnais devoir divulguer toute information pertinente à la brevetabilité, comme défini dans le Titre 37, § 1.56 du Code fédéral des réglementations.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

14 NOV

French Language Declaration

Je revendique par le présent acte avoir la priorité étrangère, en vertu du Titre 35, § 119(a)-(d) ou § 365(b) du Code des Etats-Unis, sur toute demande étrangère de brevet ou certificat d'inventeur ou, en vertu du Titre 35, § 365(a) du même Code, sur toute demande internationale PCT désignant au moins un pays autre que les Etats-Unis et figurant ci-dessous et, en cochant la case, j'ai aussi indiqué ci-dessous toute demande étrangère de brevet, tout certificat d'inventeur ou toute demande internationale PCT ayant une date de dépôt précédant celle de la demande à propos de laquelle une priorité est revendiquée.

I hereby claim foreign priority under Title 35, United States Code, § 119(a)-(d) or § 365 (b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below, and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Prior foreign applications Demande(s) de brevet antérieure(s) dans un autre pays:			Priority claimed Droit de priorité revendiqué	
9804109 (Number) (Numéro)	FRANCE (Country) (Pays)	April 2, 1998 (Day/Month/Year Filed) (Jour/Mois/Année de dépôt)	☒ Yes Oui	☐ No Non
(Number) (Numéro)	(Country) (Pays)	(Day/Month/Year Filed) (Jour/Mois/Année de dépôt)	☐ Yes Oui	☐ No Non
(Number) (Numéro)	(Country) (Pays)	(Day/Month/Year Filed) (Jour/Mois/Année de dépôt)	☐ Yes Oui	☐ No Non

Je revendique par le présent acte tout bénéfice, en vertu du Titre 35, § 119(e) du Code des Etats-Unis, de toute demande de brevet provisoire effectuée aux Etats-Unis et figurant ci-dessous.

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below.

(Application No.) (N° de demande)	(Filing Date) (Date de dépôt)
(Application No.) (N° de demande)	(Filing Date) (Date de dépôt)

Je revendique par le présent acte tout bénéfice, en vertu du Titre 35, § 120 du Code des Etats-Unis, de toute demande de brevet effectuée aux Etats-Unis, ou en vertu du Titre 35, § 365(c) du même Code, de toute demande internationale PCT désignant les Etats-Unis et figurant ci-dessous et, dans la mesure où l'objet de chacune des revendications de cette demande de brevet n'est pas divulgué dans la demande antérieure américaine ou internationale PCT, en vertu des dispositions du premier paragraphe du Titre 35, § 112 du Code des Etats-Unis, je reconnais devoir divulguer toute information pertinente à la brevetabilité, comme défini dans le Titre 37, § 1.56 du Code fédéral des réglementations, dont j'ai pu disposer entre la date de dépôt de la demande antérieure et la date de dépôt de la demande nationale ou internationale PCT de la présente demande:

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s), or § 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

(Application No.) (N° de demande)	(Filing Date) (Date de dépôt)	(Status) (patented, pending, abandoned) (Statut) (breveté, en cours d'examen, abandonné)
(Application No.) (N° de demande)	(Filing Date) (Date de dépôt)	(Status) (patented, pending, abandoned) (Statut) (breveté, en cours d'examen, abandonné)

Je déclare par le présent acte que toute déclaration ci-incluse est, à ma connaissance, véridique et que toute déclaration formulée à partir de renseignements ou de suppositions est tenue pour véridique; et de plus, que toutes ces déclarations ont été formulées en sachant que toute fausse déclaration volontaire ou son équivalent est passible d'une amende ou d'une incarcération, ou des deux, en vertu de la Section 1001 du Titre 18 du Code des Etats-Unis, et que de telles déclarations volontairement fausses risquent de compromettre la validité de la demande de brevet ou du brevet délivré à partir de celle-ci.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

24 NOV. 2000

French Language Declaration

POUVOIRS: En tant que l'inventeur cité, je désigne par la présente l'(les) avocat(s) et/ou agent(s) suivant(s) pour qu'ils poursuive(nt) la procédure de cette demande de brevet et traite(nt) toute affaire s'y rapportant avec l'Office des brevets et des marques: *(mentionner le nom et le numéro d'enregistrement).*

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: *(list name and registration number)*

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